

# Transformation of Human Resource Competencies Towards Global Competitiveness through Digital Training

Edy Saputra, Kiki Farida Ferine

## Abstract

This study aims to analyze the effect of digital-based training and technical competence on human resource competitiveness through technology readiness at PT PLN (Persero) ULP Dumai Kota. This research employs a quantitative approach using a survey method. The research sample consists of 80 employees selected using a saturated sampling technique. Data analysis was conducted using the Partial Least Square (PLS) method. The results indicate that digital-based training and technical competence have a positive and significant effect on human resource competitiveness. In addition, digital-based training and technical competence also have a positive and significant effect on technology readiness. However, technology readiness does not have a significant effect on human resource competitiveness and therefore does not mediate the relationship between digital-based training or technical competence and human resource competitiveness. This study is expected to contribute to the development of human resources, particularly in enhancing employee competitiveness through the improvement of digital-based training and strengthening technical competence.

**Keywords:** Digital-Based Training, Technical Competence, Technology Readiness, Human Resource Competitiveness.

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## Introduction

Companies that can optimally utilize technology will have a competitive advantage over their competitors. Conversely, companies that are slow in adopting technology risk losing their strategic position in the market. To perform this function, the quality of human resources (HR) becomes a key factor. According to Hasibuan (2017), quality HR not only masters technical skills but is also able to adapt to changes in the work environment, including the use of modern technology. In this context, HR competitiveness becomes very important as it relates to the individual's ability to contribute optimally to organizational goals while simultaneously enhancing the company's position in the labor market and energy industry. A strategy that can improve HR quality is through digital-based training. Digital training offers time flexibility, broader material access, and interactive learning methods that can be tailored to employee needs. Noe et al. (2019) explain that digital-based training can increase employee knowledge, skills, and attitudes more effectively compared to conventional methods, as it can be accessed anytime and anywhere. Digital training also allows employees to learn at their own pace, making it more effective in improving technical competencies relevant to their work. Besides digital training, technical competence is also a main factor in increasing HR competitiveness. Technical competence encompasses the knowledge, skills, and abilities of employees to perform specific tasks in the electricity field, such as equipment operation, network maintenance, and electricity system management. Robbins and Judge (2020) emphasize that good technical competence allows employees to complete work with high efficiency and better accuracy, thereby contributing to increased productivity and service quality of the company. The success of digital training and technical competence development cannot be fully measured without considering employees' technology readiness. Technology readiness includes the ability, knowledge, and attitudes of individuals towards the use of technology in work. According to Venkatesh et al. (2019), a high level of technology readiness will facilitate employee adaptation to digital innovations, minimize resistance, and accelerate the application of competencies gained from training. Technology readiness also serves as a link between technical competence and the effectiveness of digital training with HR competitiveness, thus potentially being a significant mediating factor.

## Problem Formulation

1. Does digital-based training have a positive and significant effect on human resource competitiveness at PT PLN (Persero) ULP Dumai Kota?
2. Does technical competence have a positive and significant effect on human resource competitiveness at PT PLN (Persero) ULP Dumai Kota?
3. Does digital-based training have a positive and significant effect on employee technology readiness at PT PLN (Persero) ULP Dumai Kota?
4. Does technical competence have a positive and significant effect on employee technology readiness at PT PLN (Persero) ULP Dumai Kota?
5. Does technology readiness have a positive and significant effect on human resource competitiveness at PT PLN (Persero) ULP Dumai Kota?
6. Does digital-based training have a positive and significant effect on human resource competitiveness through Technology Readiness at PT PLN (Persero) ULP Dumai Kota?
7. Does technical competence have a positive and significant effect on human resource competitiveness through Technology Readiness at PT PLN (Persero) ULP Dumai Kota?

## Research Objectives

1. To test and analyze the effect of Digital-Based Training on Human Resource Competitiveness at PT PLN (Persero) ULP Dumai Kota.
2. To test and analyze the effect of Technical Competence on Human Resource Competitiveness at PT PLN (Persero) ULP Dumai Kota.

3. To test and analyze the effect of Digital-Based Training on Employee Technology Readiness at PT PLN (Persero) ULP Dumai Kota.
4. To test and analyze the effect of Technical Competence on Employee Technology Readiness at PT PLN (Persero) ULP Dumai Kota.
5. To test and analyze the effect of Technology Readiness on Human Resource Competitiveness at PT PLN (Persero) ULP Dumai Kota.
6. To test and analyze the effect of Digital-Based Training on Human Resource Competitiveness through Technology Readiness at PT PLN (Persero) ULP Dumai Kota.
7. To test and analyze the effect of Technical Competence on Human Resource Competitiveness through Technology Readiness at PT PLN (Persero) ULP Dumai Kota.

## **Literature Review**

### **Human Resource Competitiveness**

According to Becker et al. (2016), HR competitiveness is also influenced by the ability to adapt to technology and innovation in the work environment. According to Porter (2016), HR competitiveness is strongly influenced by the abilities, knowledge, and skills possessed by individuals to contribute to the organization's competitive advantage.

### **Indicators of HR Competitiveness according to Porter (2016):**

1. Quality of Education and Training: Level of formal and non-formal education possessed.
2. Work Experience: Length and relevance of work experience to the job.
3. Adaptability: Ability to adapt to changes in technology and the work environment.

### **Factors Influencing HR Competitiveness**

According to Venkatesh et al. (2016), Human resource (HR) competitiveness is influenced by several factors including:

1. Competence – a combination of knowledge, skills, and attitudes that support effective performance.
2. Innovation and Creativity – the ability to create new ideas and adapt to changes in the work environment.
3. Technology and Digital Skills – mastery of information technology and the ability to utilize digital systems in work.
4. Education and Training – improving HR quality through continuous learning.
5. Motivation and Commitment – individual enthusiasm and loyalty to organizational goals.
6. Leadership – the role of leaders in developing HR potential and creating a competitive environment.

### **Digital-Based Training**

According to Salas et al. (2016), digital training can increase learning effectiveness because participants can learn independently according to their own pace and needs. According to Noe (2016), digital-based training (e-learning) allows participants to acquire knowledge and skills through electronic media, which supports learning efficiency and accessibility.

### **Indicators of Digital-Based Training according to Salas et al. (2016):**

1. Accessibility: Ease of participants in accessing training materials digitally.
2. Interactivity: Level of participant involvement in digital learning activities.
3. Resource Availability: Adequacy of available devices, applications, and internet networks.

### **Technical Competence**

According to Boyatzis (2016), technical competence determines an individual's ability to complete work according to professional standards. According to Spencer & Spencer (2016), technical competence includes measurable knowledge, skills, and abilities to carry out work effectively.

**Indicators of Technical Competence according to Spencer & Spencer (2016):**

1. Technical Knowledge: Understanding of theories, principles, and procedures relevant to the work.
2. Practical Skills: Ability to apply knowledge in daily work.
3. Professional Attitude: Dedication, responsibility, and work ethic.

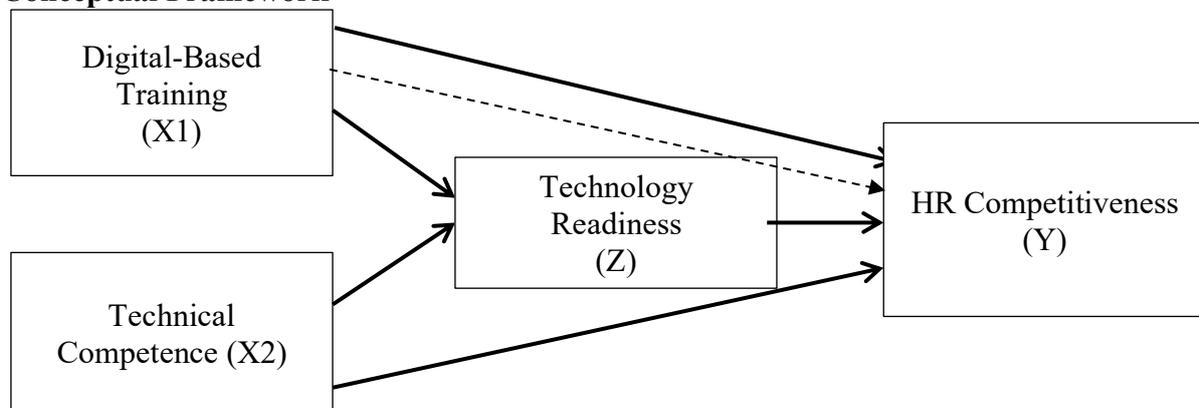
**Technology Readiness**

According to Venkatesh et al. (2016), individuals with high technology readiness tend to adopt new technologies faster and apply them effectively in work. According to Parasuraman (2016), technology readiness includes optimism, innovation, and dependence on technology in achieving goals.

**Indicators of Technology Readiness according to Venkatesh et al. (2016):**

1. Optimism: Positive view towards the benefits of technology.
2. Innovation: Openness to using new technologies.
3. Technology Dependence: Level of dependence on technology in work activities.

**Conceptual Framework**



**Figure 1.** Conceptual Framework

**Research Hypotheses**

1. Digital-based training has a positive and significant effect on Human Resource Competitiveness at PT PLN (Persero) ULP Dumai Kota.
2. Technical competence has a positive and significant effect on Human Resource Competitiveness at PT PLN (Persero) ULP Dumai Kota.
3. Digital-based training has a positive and significant effect on Technology Readiness at PT PLN (Persero) ULP Dumai Kota.
4. Technical competence has a positive and significant effect on Technology Readiness at PT PLN (Persero) ULP Dumai Kota.
5. Technology readiness has a positive and significant effect on Human Resource Competitiveness at PT PLN (Persero) ULP Dumai Kota.
6. Digital-based training has a positive and significant effect on Human Resource Competitiveness through Technology Readiness at PT PLN (Persero) ULP Dumai Kota.
7. Technical competence has a positive and significant effect on Human Resource Competitiveness through Technology Readiness at PT PLN (Persero) ULP Dumai Kota.

**Research Type and Approach**

According to Sekaran and Bougie (2018), quantitative research is used to test theories by measuring research variables with numbers and analyzing data using statistical procedures. This approach is used because this study aims to measure how much influence Digital-based training (X1) and Technical competence (X2) have on Human Resource Competitiveness (Y) through Technology Readiness (Z) with the help of SmartPLS 3.0 software.

### **Research Location and Time**

This research was conducted at PT PLN (Persero) ULP Dumai Kota, Riau Province, Jl. Jendral Sudirman No. 173, Bintan Village, Dumai Kota District, Dumai City. The research was conducted from November to December 2025.

### **Research Population**

According to Sekaran and Bougie (2018), population is the entire group of people, events, or things of interest to the researcher for study and serves as the basis for drawing conclusions. In this study, the population consists of all 80 employees of PT PLN (Persero) ULP Dumai Kota who are directly involved in operational activities and the application of digital technology.

### **Research Sample**

The technique used in this study is saturated sampling (census sampling), which is a sampling technique that uses all members of the population as respondents because the population size is relatively small. Thus, the sample size in this study is all 80 employees of PT PLN (Persero) ULP Dumai Kota.

### **Data Type and Source**

According to Cooper and Schindler (2018), research data can be divided into two types, namely primary data and secondary data.

1. Primary Data: obtained directly from respondents through distributing questionnaires to employees of PT PLN (Persero) ULP Dumai Kota.
2. Secondary Data: obtained through internal company documents, annual reports, and literature such as journals, books, and relevant online sources.

The type of data used is quantitative data, which is numerical data resulting from respondent answer scores to statements in the questionnaire measured using a Likert scale.

### **Data Collection Technique**

According to Sekaran and Bougie (2018), data collection technique is a systematic procedure used by researchers to obtain relevant information from respondents.

The data collection techniques in this study include:

1. Questionnaire, which is a list of written statements distributed to respondents to obtain data regarding digital-based training, technical competence, technology readiness, and HR competitiveness.
2. Documentation Study, which is the collection of secondary data through documents, reports, and official records from the company as well as related academic literature.

### **Data Analysis Technique**

Analysis with SmartPLS consists of two main stages:

1. Outer Model (Measurement Model): used to test the validity and reliability of constructs through the indicators forming the latent variables.
  - a. Convergent Validity: measured through loading factor values and Average Variance Extracted (AVE).
  - b. Discriminant Validity: tested using the Fornell-Larcker Criterion and Cross Loading values.
  - c. Reliability: tested using Composite Reliability (CR) and Cronbach's Alpha.

2. Inner Model (Structural Model): used to test the relationships between latent variables, including direct and indirect (mediation) effects using path coefficient and R-Square values.

### Hypothesis Testing

Hypothesis testing is performed by examining the t-statistics and p-values in the SmartPLS output.

According to Hair et al. (2018), the hypothesis acceptance criteria are: The hypothesis is accepted if the t-statistics value > 1.96 and the p-value < 0.05, indicating a significant effect between variables.

### Results

Assessing the Outer Model or Measurement Model. To determine the accuracy level of indicators in explaining the exogenous construct, indicated by the loading factor. For questions in the initial development stage, reflective measures are considered related if greater than 0.6, and the measured development is considered adequate (Ghozali 2016). Figure 1 shows the structural model:

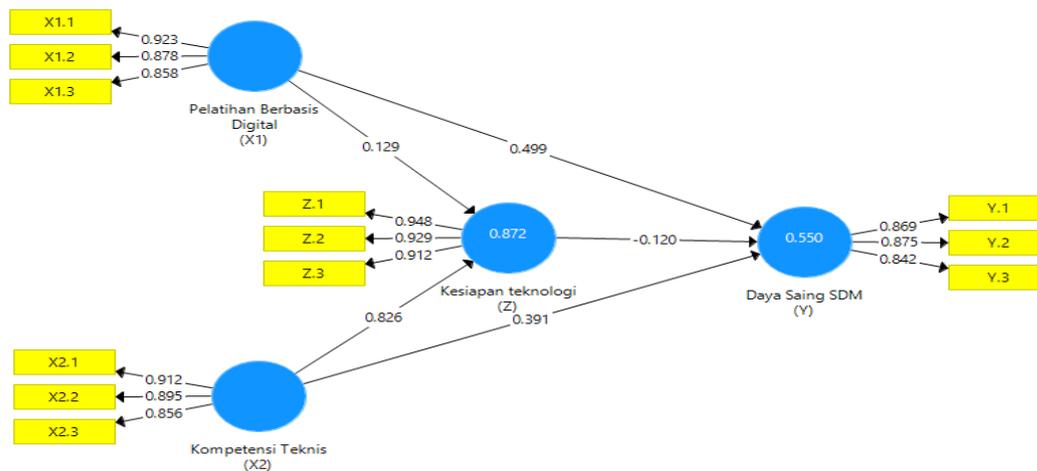


Figure 2. Outer Model

Source; Smart PLS 3.3.3.

Smart PLS output for loading factor provides results in the following table: Outer Loadings. In this study, there are equations and the equation consists of two substructures. For substructure 1

$$Z = b1X1 + b2X2 + e1$$

$$Z = 0,129 + 0,826 + e$$

For substructure 2

$$Y = b2X1 + b3X2 + b4Z + e2$$

$$Y = 0,499 + 0,391 - 0,120 + e$$

Table 1. Outer Loadings

	HR Competitiveness_(Y)	Technology Readiness (Z)	Technical Competence (X2)	Digital-Based Training_(X1)
X1.1				0,923
X1.2				0,878
X1.3				0,858
X2.1			0,912	
X2.2			0,895	

X2.3			<b>0,856</b>	
Y.1	<b>0,869</b>			
Y.2	<b>0,875</b>			
Y.3	<b>0,842</b>			
Z.1		<b>0,948</b>		
Z.2		<b>0,929</b>		
Z.3		<b>0,912</b>		

Source; Smart PLS 3.3.3.

The results of the outer loadings test show that all indicators for the variables Digital-Based Training (X1), Technical Competence (X2), Technology Readiness (Z), and HR Competitiveness (Y) have outer loading values above 0.70. This indicates that all indicators are declared valid and reliable in reflecting their respective constructs, thus suitable for use in further model analysis.

### Discriminant Validity

The measurement model for reflective indicators assessed via cross-loading and compared to the squared AVE value is a source of discriminant validity. A model is said to have good discriminant validity if the AVE value for each construct is higher than the correlation value between constructs. To use this discriminant validity assessment method, the score must be at least above 0.7. The following table presents the findings of the cross-loading analysis for discriminant validity:

**Table 2.** Discriminant Validity

	HR Competitiveness_(Y)	Technology Readiness (Z)	Technical Competence (X2)	Digital-Based Training_(X1)
X1.1	0,662	0,769	0,749	<b>0,923</b>
X1.2	0,604	0,703	0,695	<b>0,878</b>
X1.3	0,650	0,648	0,711	<b>0,858</b>
X2.1	0,730	0,826	<b>0,912</b>	0,767
X2.2	0,570	0,855	<b>0,895</b>	0,695
X2.3	0,507	0,799	<b>0,856</b>	0,694
Y.1	<b>0,869</b>	0,513	0,599	0,633
Y.2	<b>0,875</b>	0,542	0,540	0,579
Y.3	<b>0,842</b>	0,603	0,622	0,645
Z.1	0,597	<b>0,948</b>	0,898	0,750
Z.2	0,647	<b>0,929</b>	0,878	0,734
Z.3	0,542	<b>0,912</b>	0,816	0,744

Source; Smart PLS 3.3.3.

The results of the discriminant validity test show that each indicator has its highest loading value on the construct it measures compared to other constructs. Thus, it can be concluded that all research variables have met discriminant validity, so that each construct can well distinguish itself from other constructs in the research model.

### Composite Reliability

According to Haryono's book (2017), a construct is said to be reliable if the threshold value is  $\geq 0.7$ , then it is acceptable, and if  $\geq 0.8$ , it is very satisfactory. The findings of the composite reliability analysis are shown in the table below.

**Table 3.** Composite Reliability

	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
HR Competitiveness_(Y)	0,828	0,897	0,743
Technology Readiness (Z)	0,921	0,950	0,864
Technical Competence (X2)	0,866	0,918	0,789
Digital-Based Training_(X1)	0,864	0,917	0,786

Source; Smart PLS 3.3.3.

The test results show that all variables have Cronbach's Alpha and Composite Reliability values above 0.70 and AVE values above 0.50. This indicates that all research constructs are reliable and have good convergent validity, thus suitable for use in testing the structural model.

### Analysis of Inner Model

To ensure the resulting fundamental model is accurate and robust, the structural model (inner model) is evaluated. The phase of assessing the main model evaluation is observed through several indicators, including:

#### Coefficient of Determination (R<sup>2</sup>)

Based on R<sup>2</sup>, a model can be classified as strong ( $\leq 0.70$ ), moderate ( $\leq 0.45$ ), and weak ( $\leq 0.25$ ). The following are the R<sup>2</sup> values:

Table 4. R Square Results

	R Square	Adjusted R Square
HR Competitiveness (Y)	0,550	0,532
Technology Readiness (Z)	0,872	0,868

Source; Smart PLS 3.3.3.

The R Square value shows that the HR Competitiveness (Y) variable can be explained by the independent variables in the model by 55.0%, while the remaining 45.0% is influenced by factors outside the research. Meanwhile, the Technology Readiness (Z) variable has an R Square value of 87.2%, which indicates that most of its variation is explained by the variables in the model. This suggests that the research model has strong explanatory power, especially for the Technology Readiness variable.

### Hypothesis Testing

The jackknifing or bootstrapping technique can be used to determine the significance of relationships. The calculated t-value is the final result and is compared with the t-table. The estimated path coefficient value is said to be significant if at the five percent significance level the calculated t-value is greater than the t-table (1.96). Below are the results of each test:

Table 5. Path Coefficients (Direct Effect)

	Original Sample (O)	T Statistics ( O/STDEV )	P Values	Results
Technology Readiness (Z) -> HR Competitiveness (Y)	-0,120	0,508	0,306	Rejected
Technical Competence (X2) -> HR Competitiveness (Y)	0,391	1,875	0,031	Accepted
Technical Competence (X2) -> Technology Readiness (Z)	0,826	16,323	0,000	Accepted

<b>Digital-Based Training (X1) -&gt; HR Competitiveness (Y)</b>	0,499	4,773	<b>0,000</b>	<b>Accepted</b>
<b>Digital-Based Training (X1) -&gt; Technology Readiness (Z)</b>	0,129	2,228	<b>0,013</b>	<b>Accepted</b>

Source; Smart PLS 3.3.3.

1. The Effect of Technology Readiness (Z) on HR Competitiveness (Y). The test results show that technology readiness does not have a significant effect on HR competitiveness, indicated by a T-statistic value of 0.508 and a p-value of 0.306 ( $>0.05$ ). Thus, this hypothesis is rejected.
2. The Effect of Technical Competence (X2) on HR Competitiveness (Y). Technical competence has a positive and significant effect on HR competitiveness with a coefficient value of 0.391, T-statistic 1.875, and p-value 0.031 ( $<0.05$ ). Therefore, this hypothesis is accepted.
3. The Effect of Technical Competence (X2) on Technology Readiness (Z). The analysis results show that technical competence has a positive and significant effect on technology readiness, with a T-statistic of 16.323 and p-value 0.000. Thus, this hypothesis is accepted.
4. The Effect of Digital-Based Training (X1) on HR Competitiveness (Y). Digital-based training is proven to have a positive and significant effect on HR competitiveness, indicated by a T-statistic value of 4.773 and p-value 0.000 ( $<0.05$ ). Therefore, this hypothesis is accepted.
5. The Effect of Digital-Based Training (X1) on Technology Readiness (Z). The test results show that digital-based training has a positive and significant effect on technology readiness with a T-statistic of 2.228 and p-value 0.013 ( $<0.05$ ). Thus, this hypothesis is accepted.

**Table 6.** Path Coefficients (Indirect Effects)

	<b>Original Sample (O)</b>	<b>T Statistics ( O/STDEV )</b>	<b>P Values</b>	<b>Results</b>
<b>Technical Competence (X2) -&gt; Technology Readiness (Z) -&gt; HR Competitiveness (Y)</b>	-0,099	0,501	<b>0,308</b>	<b>Rejected</b>
<b>Digital-Based Training (X1) -&gt; Technology Readiness (Z) -&gt; HR Competitiveness (Y)</b>	-0,016	0,488	<b>0,313</b>	<b>Rejected</b>

Source; Smart PLS 3.3.3.

6. The test results show that the effect of Technical Competence on HR Competitiveness through Technology Readiness has a coefficient value of  $-0.099$ , with a T-statistic of 0.501 and a p-value of 0.308. This value does not meet the significance criteria, so it can be concluded that Technology Readiness cannot mediate the effect of Technical Competence on HR Competitiveness.
7. Furthermore, the effect of Digital-Based Training on HR Competitiveness through Technology Readiness shows a coefficient value of  $-0.016$ , with a T-statistic of 0.488 and a p-value of 0.313. This result is also not significant, so Technology Readiness does not act as a mediating variable in the relationship between Digital-Based Training and HR Competitiveness.

## Conclusion

1. Technology Readiness on HR Competitiveness: Technology readiness does not have a significant effect on HR competitiveness, so the hypothesis is rejected.

2. Technical Competence on HR Competitiveness: Technical competence has a positive and significant effect on HR competitiveness, so the hypothesis is accepted.
3. Technical Competence on Technology Readiness: Technical competence has a positive and significant effect on technology readiness, so the hypothesis is accepted.
4. Digital-Based Training on HR Competitiveness: Digital-based training has a positive and significant effect on HR competitiveness, so the hypothesis is accepted.
5. Digital-Based Training on Technology Readiness: Digital-based training has a positive and significant effect on technology readiness, so the hypothesis is accepted.
6. Indirect Effect of Technical Competence through Technology Readiness: Technology readiness cannot mediate the effect of technical competence on HR competitiveness, so the hypothesis is rejected.
7. Indirect Effect of Digital-Based Training through Technology Readiness: Technology readiness does not play a role as a mediating variable in the effect of digital-based training on HR competitiveness, so the hypothesis is rejected.

### Suggestions

1. Organizations are advised to continuously improve employee technical competence as it has been proven to have a direct effect on HR competitiveness.
2. Digital-based training needs to be optimized with applicable materials to be able to tangibly increase HR competitiveness.
3. Improvements in technology readiness should be accompanied by mentoring and real utilization in work to provide a direct impact on performance and HR competitiveness.

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